

Amendments to the Claims

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1. (Previously amended) A non-destructive testing system comprising:
an X-ray head assembly for directing high energy at an object to be tested;
an anode of the X-ray head assembly for generating X-rays;
a detector that detects resultant energy from the object;
a coolant flow path formed in the head assembly;
a filter holder;
a filter carried in the holder; and
a detachable connection between the holder and the head assembly that removably connects the filter holder to the X-ray head assembly in a substantially fixed position adjacent to the anode and allows the holder to be quickly and easily detached from the head assembly for filter servicing while substantially leaving the remainder of the head assembly intact and assembled together.
2. (Previously presented) The non-destructive testing system of claim 1 wherein the filter holder comprises a cover plate for being secured to the head assembly and a filter screw for being threaded to the cover plate.
3. (Previously presented) The non-destructive testing system of claim 2 wherein the filter screw can be unthreaded from the cover plate for filter servicing with the cover plate attached to or removed from the head assembly.
4. (Previously presented) The non-destructive testing system of claim 1 wherein the detachable connection is a threaded connection.
5. (Previously presented) The non-destructive testing system of claim 1 wherein the detector comprises a pair of detectors carried by the X-ray head assembly.

6. (Currently amended) A non-destructive testing system comprising:
an X-ray head assembly for directing high energy at an object to be tested;
a detector that detects resultant energy from the object;
a coolant flow ~~path~~ channel formed in the head assembly;
a filter holder;
a filter carried in the holder;
a detachable connection between the holder and the head assembly that allows the holder to be quickly and easily detached from the head assembly for filter servicing while substantially leaving the remainder of the head assembly intact and assembled together, wherein the X-ray head assembly comprises an X-ray tube and a housing surrounding at least a portion of the X-ray tube; and
liquid coolant for conducting heat away from said X-ray tube;
the housing including the flow channel for channeling flow of said liquid coolant;
the filter holder having a head portion and a stem portion with the filter carried in the stem portion;
the housing including a receptacle for receiving the filter holder to allow the filter to be disposed in the ~~a~~ flow channel to thereby provide cleaning of the liquid coolant.
7. (Previously presented) The non-destructive testing system of claim 6 wherein the stem portion defines a hollow bore dimensioned to receive said filter.
8. (Previously presented) The non-destructive testing system of claim 6 wherein said head portion is enlarged with respect to said stem portion.
9. (Previously Presented) The non-destructive testing system of claim 6 wherein said filter holder is removably received in said receptacle via the detachable connection.
10. (Previously Presented) The non-destructive testing system of claim 6 wherein said filter holder comprises a filter screw having a threaded portion along said stem portion.

11. (Previously Presented) The non-destructive testing system of claim 6 wherein said stem portion defines a cross hole and an internal bore for receiving said filter with the internal bore communicating with said cross hole.

12. (Previously Presented) The non-destructive testing system of claim 11 wherein said housing receptacle includes a threaded portion and said stem portion includes a threaded portion for mating engagement with the housing receptacle.

13. (Previously Presented) The non-destructive testing system of claim 6 wherein said housing includes an outer wall containing said receptacle and said receptacle communicates with the exterior of said housing so that the filter holder is accessible from outside the housing.

14. (Previously Presented) The non-destructive testing system of claim 13 wherein said outer wall comprises one of a cooling head and a heat sink member.

15. (Previously Presented) The non-destructive testing system of claim 14 wherein the filter holder includes the cooling head.

16. (Previously presented) The non-destructive testing system of claim 13 wherein the receptacle includes a socket portion for receiving the stem portion of the filter holder, the socket portion including a socket wall portion for deflecting coolant flow passing through a cross hole, through said stem portion.

17. (Previously presented) The non-destructive testing system of claim 6 wherein said X-ray tube includes an anode assembly and a heat sink in thermal communication with the anode assembly.

18. (Previously presented) The non-destructive testing system of claim 17 wherein said heat sink defines a socket portion for directing coolant flow exiting said filter holder in a direction generally toward said head portion.

19. (Previously presented) The non-destructive testing system of claim 6 wherein said housing comprises a hollow jacket surrounding said X-ray tube with the hollow interior of said jacket comprising said flow channel.

20. (Previously presented) The non-destructive testing system of claim 19 wherein said hollow jacket has a generally cylindrical configuration and said housing further includes a cooling head engageable with one end of said cylindrical hollow jacket, said cooling head defining an internal passageway in flow communication with the flow channel of said hollow jacket.

21. (Previously presented) The non-destructive testing system of claim 20 wherein said internal passageway extends radially in said cooling head.

22. (Previously presented) The non-destructive testing system according to claim 21 wherein said housing receptacle is located generally at the center of said cooling head, said cooling head defining diametrically opposed flow passageways of the internal passageway including inlet and outlet flow passageways extending in a generally radial direction.

23. (Previously presented) The non-destructive testing system of claim 6 wherein the interior of said housing is maintained free of said liquid coolant.

24. (Previously presented) An X-ray diffraction device comprising:
an X-ray tube including an anode assembly;
a housing surrounding at least a portion of the X-ray tube;
a liquid coolant for conducting heat away from said X-ray tube;
the housing including a flow channel for channeling flow of said liquid coolant, said flow channel passing adjacent said anode assembly so as to withdraw heat therefrom;
a filter holder;
a filter carried in the filter holder ; and

the housing including a receptacle for removably receiving the filter holder so as to dispose the filter in the flow channel to thereby provide cleaning of the cooling medium.

25. (Previously presented) The X-ray diffraction device of claim 24 wherein the filter holder includes a head portion and a hollow stem portion, and said stem portion defines a cross hole and an internal bore for receiving said filter with the internal bore communicating with said cross hole.

26. (Previously presented) The X-ray diffraction device of claim 25 wherein said housing receptacle includes a threaded portion and said stem portion includes a threaded portion for mating engagement with the housing receptacle.

27. (Previously presented) The X-ray diffraction device of claim 24 wherein said housing comprises a hollow jacket surrounding said X-ray tube with a hollow interior of said jacket comprising said flow channel.

28. (Previously presented) The X-ray diffraction device of claim 27 wherein said hollow jacket has a generally cylindrical configuration and said housing further includes a cooling head engageable with one end of said cylindrical hollow jacket, said cooling head defining an internal passageway in flow communication with the flow channel of said hollow jacket.

29. (Previously presented) The X-ray diffraction device according to claim 28 wherein said housing receptacle is located generally at the center of said cooling head, said cooling head defining diametrically opposed flow passageways including inlet and outlet flow passageway extending in a generally radial direction.

30. (Previously presented) The X-ray diffraction device of claim 24 wherein the filter holder includes a head portion and a hollow stem portion, said anode assembly includes a heat sink portion that defines a socket portion for directing coolant flow exiting said filter holder in a direction generally toward said head portion.

31. (Previously presented) The X-ray diffraction device of claim 24 wherein the housing includes a cooling head, the housing receptacle includes a socket of the cooling head, and

a fluid directing assembly removably carried in the cooling head socket for directing liquid coolant in a predetermined pattern at the anode assembly with removal of the fluid directing assembly permitting substantially unobstructed viewing of the anode assembly through the cooling head socket.

32. (Canceled)

33. (Canceled)

34. (Canceled)

35. (Canceled)

36. (Canceled)

37. (Canceled)

38. (Canceled)

39. (Previously presented) A method of cooling an X-ray tube, comprising:
surrounding at least a portion of the X-ray tube with a housing;
providing the housing with a flow channel for channeling flow of a liquid coolant;
providing a filter holder having a head portion and a stem portion;
providing a filter;
carrying the filter on the stem portion;
receiving the filter holder in the housing so as to dispose the filter in the flow channel;
and
flowing the liquid coolant through the flow channel so as to filter the liquid coolant.

40. (Previously Presented) The method of claim 39 wherein the filter is received in the housing by threading the stem portion of the filter holder to a cooling head of the housing.

41. (Previously presented) The method of claim 39 including removing the filter holder from the housing for filter servicing leaving the housing in surrounding relation to the X-ray tube.

42. (Previously presented) The method of claim 39 further comprising defining in the stem portion a hollow bore dimensioned to receive said filter.

43. (Previously presented) The method of claim 42 further comprising defining in said stem portion a cross hole with the bore communicating with said cross hole.

44. (Added) An X-ray diffraction device comprising:
an X-ray diffraction tube including an anode assembly;
a housing assembled with the tube to extend about at least a portion of the X-ray diffraction tube;
a flow channel of the housing for the flow of liquid fluid in the channel, the flow channel passing adjacent the anode assembly to withdraw heat therefrom; and
a fluid directing assembly that is removably fixed to the housing so that fluid is directed toward the anode assembly and to allow the fluid directing assembly to be removed from the housing for visual inspection of the anode assembly while substantially keeping the X-ray diffraction tube and housing assembled together.

45. (Added) The X-ray diffraction device of claim 44 wherein the housing includes a cooling head, and the fluid directing assembly is removably mounted to the cooling head.

46. (Added) The X-ray diffraction device of claim 44 wherein the housing includes a receptacle, and the fluid directing assembly includes a retainer and a fluid directing

member with the retainer removably fixing the fluid directing member in the housing receptacle adjacent the anode assembly.

47. (Added) The X-ray diffraction device of claim 46 wherein the housing includes a cooling head in which the receptacle is formed, and
a filter assembly removably received in the receptacle adjacent the fluid directing assembly so filtered fluid is directed toward the anode assembly.